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R Dawson, F.F.C.S., F.C.I., Secretary-Manager and Editor

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EDITORIAL.

Now What?

The Canadian people have spoken and in no uncertain voice. The new Canadian Government, if it can be called new, has received a real mandate from the people to prosecute the war with the utmost vigour and it is to be sincerely hoped that there will be far more co-operation and less political sniping than has been the case in the past.

It would seem though that the government itself can do much to prevent such sniping, and one of the things to be done is to educate the Canadian people through publicity to the real extent of Canada's war effort.

A good start has been made in another direction through the appointment of Hon. D. C. Howe as Minister of Munitions and Supply, and while there will probably be little change in the duties and responsibilities of Mr. Howe, the creation of such an office will bring the whole situation into the light of day.

There has been considerable criticism of the government in the past due to allegations that Canadian industry was not being used as it should be used, that only a small part of industry has so far been made any use of whatever and that Canada could produce much more in the way of munitions and supplies than has been the case, if given a chance.

Certainly there has been evidence of considerable delay in many quarters and it may be that the creation of a Ministry to supervise this part of Canada's war effort, will bring a radical change in this regard.

Now that the war front has been extended and that big naval and apparently military battles are being fought as we go to press, Canadian produce and supplies will be much more in demand.

Canadian people and Canadian industry is willing and anxious to do their part and they are well equipped to do it.

Canadian timber, Canadian bacon and butter, as well as eggs, will be more in demand now that Scandinavian supplies are cut off, and it is conceivable that other products will be needed in greater quantities with the war now apparently in full swing. Let us hope that Canada will be given an opportunity by the government to do its real share.

Just as we go to press comes news that the British Government will spend about twenty-five millions of dollars in Canada on munitions of war. This should result, if anything, on a thorough organization of Canadian industry, increased employment and the very definite establishment of this country as a supply base for Britain's war effort. Someone will now have to get busy.

Across the Secretary's Desk

It is not the policy of this column to open on a somewhat sad note, but all rules they say are made to be broken, and it is with extreme sadness that we announce that Robert Spry, six year old son of Harvey Spry, popular chairman of the Niagara Peninsula Chapter, died through drowning on Saturday, April 7th, at St. Catharines. It was indeed a tragic case, and the attendance of so many members from various chapters at the funeral of the young boy bore eloquent testimony to the esteem in which Harvey is held throughout the circuit. Needless to say the heartfelt sympathy of all members, particularly in Ontario, will go out to Mr. and Mrs. Spry in their sad bereavement.

I had the privilege of attending two meetings during the month of March which certainly gave me much pleasure. One was at Kitchener, where eighty-three attended and the other was at Windsor, where 130 were out. Naturally such attendances, while unusual, are a source of gratification and we have noticed that attendances generally are away up in most chapters this season.

Also the Student Sections and Study Groups formed in most chapters in Ontario are coming along nicely. These will not reach their peak certainly until next season, but they are growing steadily and give our younger members a chance to feel that they actually belong to something worthwhile as well as giving them real instruction.

Recently we moved to new quarters high up on the sixth floor in the same building and have now got the office straight once more. The new quarters are larger, bright and airy and altogether a big improvement on the old quarters. Just another evidence of our progress.

Talking of progress, we have made another fine advance during the present year, but we can make still further progress if members will but take a real interest. It isn't enough to merely attend meetings, although this is very important, but many new memberships can be gained by simply talking about the Society. What a fine thing it would be if each member would bring in another member during the coming year. It can be done if each member will be make an effort.

The Annual Meeting of the Society, to be held in Montreal on June 7th next, draws very near and already a number of Ontario members have signified their intention of attending. We would like a real crowd to go down to Montreal for this event and those who are interested are invited to get in touch with the writer without delay. Don't stay away because you can't talk French, that's no excuse whatever.

R. D.

New Members

Montreal Chapter.

John Moffat, Robin Hood Flour Mills Ltd., Montreal.

Toronto Chapter.

Douglas P. Bott, Toronto Asphalt Roofing Mfg. Co., Ltd., Mt. Dennis.

John V. Jacobson, Trane Co. of Canada Ltd., Toronto.

M. C. Coutts, Canadian General Electric Co. Ltd., Toronto.

Hamilton Chapter.

Robert L. Weir, Steel Company of Canada Ltd., Hamilton.

W. C. Echlin, Carroll's Ltd., Hamilton.

J. Cartwright, Aerovox Co. of Canada Ltd., Hamilton.

Kitchener Chapter.

George O'Neill, George Schnarr Button Co., Kitchener.

London Chapter.

Thomas Ashwell, John Labatt Limited, London.

J. G. Glad, Toronto "Star" Co. Ltd., London.

C. G. Cookson, Kellogg Co. of Canada Ltd., London.

C. T. McGladdery, Wm. Gerry & Sons, London.

Student Sections

Student Sections have now been organized in the London, Hamilton and Toronto Chapters, with Study Groups in the Niagara Peninsula and Windsor Chapters. These sections hold separate meetings, designed primarily to assist students in their work and study problems and should be a decided asset to the younger men in our Society. Such organizations should also result in an influx of virile young men who desire to improve their knowledge and positions and take advantage of the experience of older members.

Chapter Notes

Montreal Chapter.

There comes a time in the lives of all men when they must step aside and let the younger generation have their way. Such, indeed, is given recognition by the older-youngsters of Montreal Chapter and, willingly in our case, we set the ball a-rolling by giving the Students a night in which to display their wares. So, in the evening of Friday, March 8th, 1940, we gathered together to celebrate our Annual Students' Night.

Well, the first difficulty to be overcome was that of trying to make X2 number of members fit into the space generally occupied by a mere X number of members. This was solved by moving to larger quarters, and the Grill Room of McGill Union resounded to that old refrain, "Champ, Champ, Champ, their jaws are crunching . . ." From which it may be readily seen that the boys didst again combine business with the gentle art of catering to the needs of ye innere manne. After enjoying the pleasing aroma of the Grill Room from 6.30 p.m. to 7.45 of the same evening, the "piece de resistance" of the evening was announced—the debate between the Society's Students in Cost Accounting and Industrial Management and the Chartered Accountants Students' Society of the Province of Quebec, the subject of the debate being: "Resolved, that in Cost Work Control is more important than Cost Finding".

The teams were announced as follows:

Affirmative	Negative
Chartered Accountants Students' Society of the Province of Quebec.	Students of the Canadian Society of Cost Accountants and Industrial Engineers.
H. Savage	J. Norris
E. Lemieux	T. Boland
K. M. Place	V. MacDonald

The judges, R. W. Louthood, representing the Society; C. W. Leach, President of the Chartered Accountants Students' Society of the Province of Quebec; M. B. Morency, President of the Montreal Branch of the General Accountants' Association, representing the neutral panel; needed wisdom such as that possessed by a certain Solomon to arrive at their decision that the Students of the Canadian Society of Cost Accountants and Industrial Engineers were to be the proud holders of the "Students' Trophy" for the debate year. The trophy donated by our good friend, D. R. Patton, who has spent much of his time in organizing the Society's educational program, is to be competed for each year, the debates to be held under the auspices of the Society, this being the first award of the Montreal Chapter "Students' Trophy".

Your scribes decline to enter into a debate in these columns as to the relative merits of either side of the question under discussion. Suffice to say that, after the debate, we heard many of our dyed-in-the-wool senior members wax strongly over their pet viewpoints. We all agree that the convener of the debate, F. W. Loiselle, put it over in a most satisfying way.

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This, we might add, is not all. An Accountants "Information Please" added zest to the evening. The conveners of the contest, R. H. Bissell and D. R. Patton, had the Crosby and the Dustan teams lined up in fine fettle. Allcorn of the Dustan team went down fighting, thus leaving the Crosby team in command of the field. The individual prize was not yet won as Stanley and Burke still manned their line. Question after question flew fast and furious. It became more and more difficult to find questions. That one question that would bring final victory came up at last, and we find Burke of the Crosby team taking the plaudits for a splendid intellectual scrap. Who among us could stand long in the face of some of the questions fired at the team such as are now given a few examples?

'Twas a pleasing sight indeed to see some of the "Old Chargers" of past debates champing at the bit when they thought they knew the answer to one of these brain teasers and couldn't do anything about it from the floor (maybe a tilt to the death between the "Oldtimers" and the "Students" would cool off some of their ardor and create a still greater respect for the "intelligence of youth"). 'Twas a more pleasing sight to see the presentation of prizes to the winning team, all of whom received a large box of delectable biscuits, and the presentation of the individual prize, a larger—very much larger—box of the same family of biscuits. We would be amiss in our notes if we failed to mention that the generous donator of the prizes was the well known figure in Montreal Chapter circles, T. I. Smyth, who also holds a respected place in the food industry of the Province. We must also mention the splendid mathematical work performed by the official scorers of the "Information Please", Don Peddie and M. H. Bacon, who, with sensational feats of figure manipulation and wizardry, and scorning mere mechanical aid, added, multiplied, squared, and rooted their way to the announcing of the winners.

Toronto Chapter.

The March meeting of the Toronto Chapter featured a Plant Visit to the plant of Massey Harris Co., Ltd., where guides conducted the members through the plant in a most interesting visit.

Dinner was served at the Canadian Military Institute, and following a business session a most instructive evening consisting of motion pictures was served up for the edification of the large number present.

A motion picture on Cost Reduction from the Massey Harris Company was first shown and later pictures showing the growth of the Trans-Canada Airlines and a picture depicting the sinking of the German pocket battleship, Admiral Graf Spee. Altogether it was a grand day.

Hamilton Chapter.

The late March meeting of the Hamilton Chapter was in the nature of an "Information Please" night, after the fashion of the well known Radio program of that name. Questions were submitted by the members for which they received payment if the question was used, and also if the member who submitted the question was present. The Board of Experts consisted of Aleck Howey, Lloyd Edwards and Allan Mouncey, and while no one present agreed with them they got through the work in fine style.

CHAPTER NOTES

Following the regular meeting the Student Section convened and elected Jim Buckett as chairman. They also had a fine meeting, and interest in this class of meeting is undoubtedly growing.

Niagara Peninsula.

The March meeting of the Niagara Chapter was marred by terrible weather, for it was impossible to travel by road on such an evening, and this was reflected in the attendance which was around the twenty-five mark. However those who did attend were fortunate in hearing Claude Rainey of Buffalo who spoke on "The Duties of the Comptroller".

For the April meeting the speaker will be R. W. Peden of Detroit, who will address the members on "Pricing the Product", and it promises to be an exceptionally good meeting for Mr. Peden is known as a really brilliant speaker.

Kitchener Chapter.

Kitchener Chapter held the largest attended meeting in its history on March 14th, when Mr. D. J. Turnbull of the J. D. Woods Company, Toronto, spoke on "Work Simplification". The talk was supplemented by motion pictures which proved most interesting and instructive, and Mr. Turnbull's talk was listened to with rapt attention, and it is safe to say that the members were well rewarded for their attendance. The attendance was eighty-three, which is a great tribute to Mr. Turnbull and also to the untiring efforts of the officers and directors of the chapter.

London Chapter.

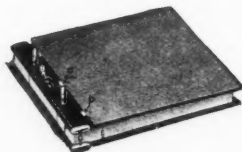
Due to a series of mishaps while driving from Detroit on a bad evening, the speaker scheduled for the London Chapter meeting on March 21st, Mr. L. D. Stafford, was unable to appear in time for the meeting. In fact, he finally arrived there after 11 p.m. after some car trouble and after having to be hauled from the ditch. However, Mr. Stafford will address the members on the occasion of the April meeting on April 18, and doubtless there will be a good attendance. In the meantime, the Student Section continues to function in an admirable way and the meetings are much enjoyed.

Windsor Chapter.

The meeting of the Windsor Chapter, held on March 29th, was the most successful in the history of the chapter, for on that occasion it was a joint meeting with the Detroit Chapter, N.A.C.A. One hundred and twenty attended the dinner at the Norton Palmer Hotel, and ten others came in for the meeting. The speaker was Mr. Blackwood, Secretary-Treasurer of the Briggs Manufacturing Company, Detroit, and his subject was, "Planning For Business". Mr. Blackwood gave a very interesting and instructive talk and many questions were hurled at him at the close of his address. Harry Cox moved a hearty vote of thanks to Mr. Blackwood. The Secretary-Manager of the Society was also present and spoke briefly.

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Newer Fields in Cost Application

By

CHARLES REITELL

Stevenson, Jordan & Harrison
New York, N.Y.

Paper delivered before Niagara and Hamilton Chapters, February 21, 1940.
Introduction.

In Cost Accounting, as in many other fields of scientific endeavor, progress consists in the evolution of new things. Cost accountants, if they are to keep abreast with commercial and industrial growth, must develop new methods, forge into new fields of endeavor, and most important of all, adopt new ways of thinking.

This paper is pointed definitely toward the discussion of some of the newer phases of cost accounting technique and philosophy which have passed the pilot stage of experimentation and have now become an integral part of regular cost procedures in several forward-minded enterprises.

On the other hand, what is presented here is so new and, as far as I know, has been tried in so few establishments, as to make it unwise to argue for general application. Only as wider acceptance is made can the final worth of this material be evaluated.

If, however, I have so directed and stimulated your thinking as to have you try out some of these innovations, then my efforts will more than be repaid.

These are three phases of progressive thinking and progressive methods which are emphasized:

1. The importance of measuring periodically and for the different merchandising territories, the interplay of costs, prices and volume as to their effect upon net profits from such territories.
2. The integration of revenue, costs and volume into a profit plan wherein controls and policy formation are achieved through the complete analysis of variances.
3. The establishment of a research staff office, or committee, whose function is to interrelate some of the activities of controllership, merchandising, production, and financing, as a Management Research Director, or a Management Research Committee.

Let us discuss in considerable detail each of the above phases.

The Interplay of Costs, Prices, Volume and Net Profits.

In order to bring meaning to the interplay of costs, prices, volume and their effects upon net profits, let us discuss each element separately and then combine them to see what the picture looks like.

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Would you believe that there are still major executives who think that price changes, cost changes and volume changes move in exactly the same ratio in their effect upon earnings. They continue to believe that a reduction of 5 per cent. in price is compensated when they enjoy a 5 per cent. increase in volume, and shape policy accordingly. Likewise, if costs are increased 5 per cent., then an increase of 5 per cent. in volume will forego the need of any price adjustment.

It is not so important that their thinking is so deadly wrong, as is the astonishing situation that they have no methods evolved for measuring the interplay influences. They guess because they lack knowledge. They lack knowledge because we cost accountants have been closely concerned with factory costs, and perhaps merchandising costs, and have been blind to the all-important measurement showing the interplay of "cost, price, volume and profit"—measurements which are basic to policy formation and in profit planning.

Let us take up, first, the influence of volume upon profits. Table 1 gives both the per cent. changes in volume and in net profits for one company. These changes are measured from the standard profit budget established for normal activity.

Table 2 is the volume and profit picture from another company which shows the same general conditions as seen in Table 1, although the profit change in Table 2 does not fluctuate so widely as it does in the former company.

Table 2

EFFECT OF VOLUME CHANGE UPON NET PROFIT

	360,000 Volume Units	400,000 Volume Units	440,000 Volume Units
Net Sales at \$9.25 per Unit	\$3,330,000	\$3,700,000	\$4,070,000
Fixed Costs	980,000	980,000	980,000
Variable and Semi-Variable Costs	1,814,000	2,017,000	2,209,000
Total Costs	\$2,794,000	\$2,997,000	\$3,189,000
Net Profit	\$ 536,000	\$ 703,000	\$ 881,000
Net Profit per Unit	1.488	1.757	2.002
Per Cent. Change in Net Profit	-25.1%	*	+25.3%
Per Cent. Change in Volume	-10.0%		+10.0%

Table 1

EFFECT OF VOLUME CHANGE UPON NET PROFIT

Per cent. Change in Volume—												
-10.0%	- 8.3%	- 6.7%	- 5.0%	- 3.3%	- 1.7%	Normal	+1.7%	+ 3.3%	+ 5.0%	+ 6.7%	+ 8.3%	+10.0%
Per Cent. Change in Net Profit—												
-39.5%	-32.8%	-26.3%	-19.8%	-13.3%	-6.7%	Activity	+6.5%	+13.0%	+19.6%	+26.2%	+32.7%	+39.3%

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As is seen in both of these tables, net profits vary widely within the much narrower changes in volume.

Now, let us look at the next factor—Price. The following Table 3 was taken from the same concern as Table 2:

Table 3
EFFECT OF PRICE CHANGE UPON NET PROFIT

	10% Reduction	Present Price	10% Increase
	\$8.325 Per Unit	\$9.25 Per Unit	\$10.175 Per Unit
Sales	\$3,330,000	\$3,700,000	\$4,070,000
Total Costs	2,997,000	2,997,000	2,997,000
Net Profit	\$ 333,000	\$ 703,000	\$1,073,000
Per Cent. Change in Net Profit	—52.6%	*	+52.6%

One should note that a 10 per cent. price change, in its effect upon net profits for this concern, is more than twice as great as are the effects of volume change. In fact, a little analysis will quickly show that a given per cent. change in price has a greater influence on net profits than any other like per cent. change, be it in volume or costs. This condition, though perhaps trite to the accountant, has never become adequately impressed upon the executives. Otherwise, foolhardy price cutting would not be so prevalent.

Now we come to another interesting individual influence upon net profits, which is the effects that come with changes in costs. Most often in considering cost influences one must find what kind of costs have changed: Are they the fixed costs, the variable costs, the semi-variable costs or the curved costs? If the volume remains constant, however, changes in costs have no different influence, be they fixed, variable, or a mixture.

With volume remaining constant, a 10 per cent. change in cost will not be as violent as a like per cent. change in price. Naturally so, because in price your per cent. is calculated on a larger amount (revenue) than is the corresponding cost figure. From this comes the practical corollary, that where the profit margin is narrow a change in costs will have a greater influence "percentage-wise" on profits than where the profit margin is wide.

The influence of cost changes in the light of volume change is seen in the following charts. As the charts show, where the fixed costs are high and the variable costs low, the change in profit or loss, in terms of volume, is rapid (Chart 4). Conversely, where the fixed costs are low and the variables high, then the profits, in terms of volume change, are not so violent a change.*

From the above influences one can readily construct a composite picture of the three factors, all changing, whose interplay follows one of the following patterns:

Costs	Volume	Prices		
—	+	+	=	} Variation in Net Profit
+	—	+	=	
+	—	—	=	
—	—	—	=	
+	+	+	=	
+	+	—	=	

COST AND MANAGEMENT

The complete analysis of the interplay taken for the company as a whole falls short, however, in being of full practical value in merchandising a certain product in a definite territory through a particular type of sales outlet. The following are typical questions that face the accountant for answer, and these call for an individual territorial, product and outlet breakdown, which the total composite figures fail to give:

What will be the influence on my net profit if I increase price 5 per cent., increase costs 7 per cent. and find my volume reduced 2 per cent. for commodity "A", which is sold through distributor channels in Zone 6?

What will be the influence on net profits if my product is sold through a glass container which has a multiple trippage of 42 trips as contrasted with selling it in a non-glass mono-trip package in which my variable costs for the one trip container show a 32 per cent. increase over glass?

What amount of sales and advertising allowances can I make to distributors in trading Zone 17 if my volume should increase 15 per cent. with no change in price structure?

Is it more profitable for me to make my sales in the New England area through retailers or through distributors?

In summing up the value of the interplay analyses, one finds that the executives for the first time appreciate the importance of being profit-minded rather than thinking only of volume increases. Time and time again are found executives who believe that if they could but sell more and more of their products they would be ushered into the Elysian fields of large profits. In order to get an extra volume, price cutting has been the means. The very moment, however, they face the cold, unbending facts as shown by the above type of interplay analysis, the foolish philosophy of gaining volume by cutting price is forthwith thrown to limbo.

The Profit Plan Constructed.

Probably profit planning is not new among many of you cost accountants. I take it that a great many of you are doing profit planning work at the present time. From my acquaintance, however, I find comparatively few who build their profit plan on a basis of complete standard costs and budgets applied throughout the entire enterprise, that is, covering manufacturing, merchandising and revenue. The practical value of this sort of analysis is shown when variances are analyzed.

Let us take the important variances which cover revenue. These variances must be broken down into the different types of sales outlets, such as retailers, distributors, mail order, government and export. The analysis of the revenue variances for each of these types of outlets is broken down into three distinct variances. First, the physical volume which may be greater or less than the established quota used in building the profit plan. Second, the variance that has to do with prices, which may have stiffened or weakened from the one established as standard. Third, the variance that occasionally shows itself wherein, although the price structure and the volume may remain constant, there is a shift in the total revenue because of a shift by the buyer toward one product and away from another. Where this variance is shown we can usually term it as "revenue variance on account of mix".

NEWER FIELDS IN COST APPLICATION

The practical value of such a revenue analysis shows itself when the variances are considered in the light of specific conditions and problems that arise within a given trading zone. Reasons for changes in volume must be ferreted out and remedied. Price structures must be considered not only in the light of prevailing prices but also in the light of specific trading zones yielding adequate profit.

I do not think there is a more important tool for the sales manager than this revenue analysis. He sees at once:

(a) How each selling zone is doing regarding physical volume, usually expressed in the different types of trading accounts involved.

(b) Where the price changes are taking place and for what reason, and what such changes mean in terms of net profit realization.

(c) How advertising and other large merchandising expenses relate to the amount of net profit realization by trading zones and by products.

(d) How well the particular salesmen are doing in each zone in terms of:

1. Maintain coverage.
2. Meeting the quota.
3. Expenses.

For those who have not been operating on a complete standard cost installation I believe it would be interesting to see a complete list of all variances necessary for profit planning control. They are as follows:

I—Revenue:

1. Revenue volume variance.
2. Revenue price variance.
3. Revenue mix variance.

II—Plant:

4. Material price variance.
5. Material yield variance.
6. Direct labour variance.
7. Controllable overhead variance.

III—Expenses:

9. Shipping and delivery variance.
10. Selling expense variance.
11. Advertising variance.
12. Administration variance.
13. Net profit variance.

As is well known among cost accountants who work under standard costs, flexible budgets are used wherever needed in the above classifications.

Establishment of Management Research Director.

I have looked in vain for a definition of "Management Research" and have yet to see the functional position established of "Management Research Director". No doubt many of the functions of the management research director are now carried on by the controller, budget director, plant engineer, sales manager, treasurer and others.

The value of setting up a functional research officer or committee as a staff unit, absolutely cut off from any line responsibility, and without

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authority to tell people what to do, or how to do it, means that the function is removed from constant operating disturbances. Because of this divorce from line responsibility, the management research director is placed in a very beneficial position to analyze objectively all the interrelated influences that end in net profit realization. Such a function must draw heavily from the engineering department, sales department, advertising department and the controller for his material. He will be much more interested in the review of budgets and standards in relation to volume, price structures, cost structures, advertising, design changes and the like, than in the particular operation of any one department.

As I envision this work, the management research director will set up as a co-ordinating committee, men drawn from the organization. Before this committee he will show by statistical accounting and engineering compilations, the conditions, trends and influences that should be considered in shaping policy. Likewise, upon him will fall the burden of checking how well the performance coming from operating practices adopted on his suggestions follow the predetermined plan as outlined by himself.

In one small company with which the writer is acquainted the above functions are performed by the president himself. He not only arranges time to do this internal management research but also applies the same objective analyses of his company's affairs as related to the industry as a whole.

What type of person should be called upon to fill this type of work? My answer is that he should be the cost engineering type of person, one who has excellent analytical ability, who understands the detailed preparation of costs and other accounting data, who knows shop practices, particularly from a routing, planning and scheduling point of view, and who has had experience in the merchandising field. I admit that is a big order to find all packed up in one human being, but I believe the job is important enough to see that that sort of person is built in every fairly large organization.

It would be presumptuous, indeed, to assume any credit for doing any original thinking regarding the functional setup of management research. This research idea, I believe, was born in the fertile mind of our good friend, Charlie James, who needs no introduction to members of the N.A.C.A. I know that he has been working out the idea in the practical field, as has also the writer. Although unwilling to subscribe to its general application, I am one who feels that it should be discussed openly, particularly among us accountants, controllers and engineers who may feel that our territories are being invaded by some new and strange type of technician.

I parallel my thinking regarding management research by studying carefully the functions and fields of research in chemistry, physics and marketing. Outstanding achievements have been made in each of these fields and as I view the situation, similar attainments can be reached in the field of management.

The question arises, "Why has management research been brought into an article on cost accounting?" The answer is that the measurements of the cost accountant furnish the basic data upon which much of management research must rest.

NEWER FIELDS IN COST APPLICATION

Conclusion.

No doubt many of the points which I have raised here are in part a matter of your own experience. Perhaps much which I have set forth and which I consider new is not really so new after all. That matters little. The important thing is that I have tried to bring together all these progressive activities into a unified picture which in a composite way spells management research in American industry.

* Unfortunately it was found impossible to reproduce these charts.

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Cost Accountants.

Constructing Budgetary Controls That Control

By

A. G. HOWEY

Dominion President of the Society.

An address delivered before Windsor, Montreal, Hamilton and
Toronto Chapters.

Mr. Chairman, Gentlemen:

First, let me say thank you for your kind introduction. Thank you for the privilege you have extended to me in asking me to address your Chapter. I was going to say privilege and honour, but I have been told it is only an honour when the address is honourably presented, therefore I confine my remarks to privilege only.

Allow me to reminisce for a few minutes. Accounting has, like every other profession, advanced in many phases in the past two decades. It has produced Standard Costs, punched card accounting (?), mechanized accounting practices, tied in accounting with motion study, budgetary control, etc. Most of these are newer than radio or domestic refrigeration. Unfortunately, Accountants did not know the value of "window dressing" the names of these new applications, as for instance the Corn Doctor is a Chiropodist and so on, so when Standard Costs were developed it was just plain, unvarnished Standard Costs and Accountants immediately went on the defensive—(and some still are), because the word "Standard" implied something rigid, or an inflexible rule, hence the opposition Standard Costs received.

Now I believe if Standard Costs had been named, say, "The Red and Infra Red Cost Eliminator", opposition to change would have been mainly overcome.

And now Budgetary Control. "Budgets"—everyone detests the word, whether it be government (Provincial or Dominion), or personal. "Control"—immediately you think of the restrictions with your ideas of liberty,

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like government controls, and maybe self control or birth control. However, will you forget the obnoxious name and consider with me for a while this latest phase of accounting?

The subject to-night, "Constructing Budgetary Controls That Control", is somewhat complicated and detailed, therefore I will only touch the high spots in the preliminary stages, but if you have any questions regarding the detail of the preliminary steps, I will be glad to answer them if I can, in the question period.

I am going to assume that we have prepared our departmental overhead budget (?), our Selling Expense Budget, and our Administrative and Financial Budgets. I am also going to assume that our Sales Department has prepared our Sales Budget, which they have broken down by salesmen or territories as a Salesmen's Budget Control. The Salesmen's budget may be increased slightly if any cancellations enter your particular business, or the commodity requirements moved ahead if orders are taken for delivery with future or seasonable datings.

Now at this point I want to point out to you that budgeting is not a haphazard guess or forecast as some believe. It is not a thin air theory, but a practical control which can control to such an extent as to make the actual results approximate the Budget, not the Budget approximate the actual. Of course a budget of any kind must be flexible and if any major change takes place in, say, volume of sales due to new markets, etc., or radical changes in material costs, labour costs or expenses, a new budget should be made.

Our first step now is to produce an Operating Budget. Your Operating Budget or Profit and Loss Budget can be set up as follows:

- Sales.
- Materials Used.
- Direct Labour.
- Overhead.
- Cost of Production.
- Plus or Minus Inventory Change (Process and Finished).
- Cost of Sales.
- Gross Profit.
- Selling, Administration, Financial Expenses.
- Operating Profit.
- Any Other Deductions.
- Net Profit.

Your production is determined by your sales, plus or minus your inventory change. This production figure is the basis for materials and direct labour, which is applied on a percentage basis.

The expenses are broken down from the respective expense budgets.

Starting with the actual Balance Sheet at the end of the fiscal year, or estimating it if you prefer to have your budget prepared well in advance, the Cash Budget and the Balance Sheet Budget should be drawn up at the same time as, in many cases, the same set of working figures on the detailed schedules will give you the required figures for both budgets.

CONSTRUCTING BUDGETARY CONTROLS THAT CONTROL.

Cash Budget.

Receipts:

- Collections.
- Miscellaneous.
- Total.

Disbursements:

- Materials and Supplies.
- Direct Labour.
- Factory Expense, including Indirect Labour.
- Selling Expense.
- Administrative Expense.
- Bank Interest and Charges.
- Sundry Financial.
- Bond Interest.
- Sales Tax.
- Capital Expense.
- Miscellaneous.
- Total.

Balance Sheet.

Assets—Current:

- Cash.
- Net Receivables after Bad Debt Reserve of:
- Inventories—Raw.
 - Process and Finished.
- Total.
- Less Reserve.
- Net Inventories.
- Sundry Prepaid.
- Total.

Liabilities—Current:

- Bank Loan.
- Accounts Payable.
- Accrued Wages and Salaries.
- Accrued Sales Tax.
- Sundry Accrued.
- Total.

Fixed Assets Net After:

- Depreciation Reserve.
- Deferred.
- Total.

Less Fixed Liabilities (Mortgage or Bond Issue):

- Fixed Surplus.
- Total Surplus (Net Worth).

The first item to calculate is your Accounts Receivables as follows: Budgeted first period sales plus calculated sales tax to give the Gross Sales; add to the closing Balance of Receivables, deduct estimated Collections based on previous experience (giving detail), also deduct estimated Bad Debts to give you Closing Balance of Receivables for the period. The estimated col-

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lection figure less estimated Sales Discounts from the Selling Expense Budget gives you the Net Collections. At this time take the Opening Balance of Bad Debt Reserve, add to it your estimated Reserve for the period and deduct your estimated Bad Debts to give you the closing figure. Thus, from the above we get Net Collections, Gross and Net Receivables, Bad Debt Reserve, Accrued Sales Tax, and Sales Tax Disbursements.

The next item is Inventories. Grouping the Process and Finished together serves the Budget purpose and saves time. (They can be broken down afterward in detail). Adding or subtracting to the Opening Balance the estimated change in Inventories according to the Production estimate gives your closing figure of Process and Finished Inventories.

Raw Material Opening Balance less the Production estimate of Materials Used, subtracted from your estimate of what the Raw Material Inventory closing should be, gives you the amount of Raw Material Purchases. The Closing Balance of Inventories less Reserve gives Net Inventories. If a periodic reserve is set up, of course the accumulated reserve must be deducted each period. (Give detail of charting inventories).

The next item is Accounts Payables. To the Closing Balance of Payables is added the purchases of Raw Materials and Supplies, also any invoice covering Taxes or Workmen's Compensation, etc., which may be carried for some time in Payables before payment. From this total is deducted the Cash Payments (detail), plus the payments of Tax invoices, etc., giving the Closing Payable Balance. If salesmen are paid on a Drawing Account basis with commissions applied against the Drawing Account, a separate schedule should be made showing the periodic overdraft, which must be deducted from Closing Payable Balance to give the true balance of Payables. From the Material Payments is deducted Cash Discounts, giving the Net Cash Payments for Materials and Supplies.

Continuing with the Balance Sheet, we have Accrued Wages and Salaries. To the Closing Balance is added the periodic amount of Direct Wages as estimated on the Production Budget as required to manufacture the estimated production for the period. The estimated Indirect Labour, Shipping Labour, Clerical Salaries and Executive Salaries from the periodic expenses on the Operating Budgets are added also. Deduct from this total the amounts to be paid periodically, leaving the Accrued Balance. Of course each one of these items is set up on a periodic schedule of its own, and from the detailed schedule of Direct Labour we get the Direct Labour cash payments. (Detail).

Sundry Accrued, composed of Taxes, Water Rates, Hydro and Bond Interest and Dividends, is set up under separate schedules, taking the Closing Balance, adding the Period charge from the Operating Budget and deducting the invoice for same or payment in case of Bond Interest and Dividends to arrive at the Accrued Balance.

The Closing Balance of Net Fixed Assets plus estimated purchases of new equipment, less periodic Depreciation Reserve, gives the Net Periodic Fixed Assets. To the Closing Balance of Depreciation Reserve is added the periodic depreciation set-up to give the periodic accumulative Depreciation Reserve.

CONSTRUCTING BUDGETARY CONTROLS THAT CONTROL

From the Closing Deferred Asset Balance is deducted the periodic charges to operations, giving the Closing Periodic Balance for the Balance Sheet Budget.

The Fixed Liabilities are now calculated. If any payments are to be made on the Bond Issue or Mortgage, these must be deducted in the period in which they will be paid, giving the correct balance in that period for the Balance Sheet Budget.

Deducting the Fixed Liabilities from the Total Fixed Assets gives the Fixed Surplus. The Fixed Surplus is the Capital Stock plus the Surplus Account.

Now working backward, take the Closing Total Surplus amount and add to it the periodic Profit or deduct the Period Loss as shown on the Operating Budget, also deduct any Dividends paid or Stock Redemption to give the periodic closing of the Total Surplus. From Total Surplus deduct Fixed Surplus, which gives us our Liquid Surplus, or Working Capital.

Up to this point we have established everything on the Balance Sheet except our Cash or Bank Loan, as the case may be, and the Sundry Prepaid Items, so let us now complete the Cash Budget.

The next item is Factory Overhead. From the periodic Budgeted total we deduct the periodic charges for Indirect Labour, Administrative Salaries, Clerical Salaries, Compensation Insurance, Taxes, Water Rates and Hydro Charges, and add them back in the period in which they will be paid. This is obtained from the separate schedules set up on each item. This then gives us the Factory Overhead Periodic Cash Payments.

Selling Expense Payments are handled in the same manner, except that deductions are made for Bad Debts and Sales Discounts from the periodic budgeted totals, but are not added back as no cash is paid out for these items—they already having been deducted from the Receivables and Collections respectively.

Administrative Expense payments are calculated exactly as Factory Expense. Care should be taken here that Deferred Charges are eliminated from Expense payments if they are included in the Expense Budgets.

Bank Interest and charges are obtained from the Financial Expense Budget and are set up in the period in which they will be paid.

Sundry Financial Payments are the balance of the Financial Expense Budget and are treated exactly as above.

Bond Interest Payments are taken from the separate schedule prepared for the Sundry Accrued Bond Interest.

Capital Expense Payments are taken from the schedule of Fixed Assets and payments are posted to the periods in which they will become due.

Miscellaneous. This last item covers Directors' fees, if any, Stock Redemption, Dividends or Bond Sinking Fund payments as and when they fall due.

This completes our Cash Budget. Now we deduct the Cash Disbursements from the Cash Receipts and add or subtract as the case may be to the Closing Cash or Bank Loan Balance and we arrive at our Closing Periodic Cash Balance.

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This now enables us to check our Balance Sheet by adding the Total Liabilities to the Liquid Surplus to obtain our Total Current Assets. Using the Sundry Prepaid as a balancing item if this is the usual small item generally found in most manufacturing plants the Total Current Assets should agree with our predetermined figure—that is, if we have done our work mathematically correct. I might add that if this prepaid item is of large proportion, a separate schedule should be drawn showing the periodic balance after distribution.

From these working figures you can now budget the detailed Process, Finished and Raw Inventory and Purchase Budgets.

You are now prepared to turn over to your Management a control to cover all phases of your business, and when the actual performance is compared to the Budget, the necessary steps may be taken to correct any out-of-line performances.

Do not be discouraged if your first Balance Sheet Budget is not as close as it should be, as it takes a few years to obtain the necessary background to estimate with sound formulas instead of just guessing.

While some of you may still feel the word "estimate" is predominant in this talk, I can assure you that the Cash and Balance Sheet Budget is just a mathematical problem with a flavouring of common sense, combined with the necessary study of the past, present and future history, economic position and policies of any company.

Let us see just what we have put together.

1. Expense Budgetary Controls; Factory, Selling, Administrative and Financial that controls every expenditure by Superintendents, Foremen and Department Managers.
2. Sales Budget Control that controls the sales effort and points out well-done or not-so-good, or as sometimes happens, total Sales Budget obtained but commodities out of line.
3. Salesmen's or territorial Budgetary Control when the Sales Manager passes the buck to the salesmen.
4. Operating Budget Control. The Operating picture at a glance in ratio to the sales dollar.
5. Cash Budget Control, enables the Treasurer or Comptroller to plan the cash expenditures.
6. Balance Sheet Control. Managements are in the hole in planning working capital position, Receivable liquidation, etc.
7. Inventory Controls—Raw, Process, Finished. The "Stop and Go" signal so that none get out of line under any condition.
8. Purchase Control. Just a deterrent to the gambling fever that sometimes pervades the Purchasing Department.

I hope this has sounded intelligent to you and not as confusing as a story I read last week of a man whose wife always worked on theories, one theory being that you can find whatever you want when you don't want it by looking where it wouldn't be if you did want it.

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by eliminating the handicaps
that slow up office routine!

Here is how Burroughs can help you

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The booklet illustrated, "Ways to Save Time in an Office," suggests definite and practical ways to start such a survey in the office. For a gratis copy of this booklet, telephone the local Burroughs office, or write direct.



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Literature Received

Principles of Accounting Classification.

The Australian Accountant. January.

An exceptionally good article which deals with methods of approach in planning, benefits to be derived and a resume of the classification as operated in a specific plant.

The Interlocking of Financial and Cost Accounts.

Cost Accountant. January.

Another fine article dealing with the tying in of Cost Accounts with the General Books.

Selling and Distribution Costs.

The Cost Accountant. January.

An article of exceptional value especially at a time when such a subject is very much to the fore.

Accounting Work on a Punched Card Installation.

Accountancy. February.

Deals with objections usually raised to Punched Card Accounting and describes in detail what can be accomplished by such methods.

Several Phases of Budgeting for an Office Appliance Manufacturer.

N.A.C.A. February 15.

Budgeting For Control.

N.A.C.A. February 15.

Both very fine practical articles and both deal with budgeting in their specific industries.

A Preliminary Examination of Some Methods Used for Valuing Inventories.

Canadian Chartered Accountant.

Deals with the Last In - First Out and other methods of valuing inventories, and is of real value, particularly at this time.

Accounting Control at a Race Track.

N.A.C.A. March 1.

Deals with Accounting Control in what is undoubtedly a big business.

Papers On Auditing Procedure and Other Accounting Subjects.

American Institute of Accountants.

A series of papers presented at the Fifty-Second Annual Meeting of the American Institute of Accountants and a most valuable collection. The collection deals with Discussion of Auditing Procedure, Inventories, Detection of Fraud by Independent Auditors, Whose Balance Sheet Is It?, Extension of Accounting Practice, Internal Conduct of an Accounting Practice, Municipal Accounting Session, Progress in Accounting Research and the Income Tax Session.

LITERATURE RECEIVED

Finished Goods Inventory Practice.

N.A.C.A. March 15.

This is a compilation of the studies of the Research Department of the N.A.C.A. on a very vexed question and should be of real interest to all accountants who have anything to do with inventories.

The Slump Ahead.

The Cost Accountant. February.

This covers a Mock Board Meeting of a Company in England concerning the aftermath of the present hostilities and is really interesting.

Terminal Costing.

The Accountants' Journal. February.

A short but very informative article of interest especially to those engaged in the Contracting Industry.

Standard Costs.

The Australian Accountant. February.

An excellent and very complete article on Standard Costs.

Material Control.

The Australian Accountant. February.

A series of most instructive articles on various phases of material control well worth reading.

Types of Cost Accounting.

The Australian Accountant.

A most complete article dealing with various types of cost systems.

The Role of the Accountant in the Control of Distribution Costs.

N.A.C.A. April 1.

Fixed and variable elements in Selling Costs.

N.A.C.A. April 1.

Here are two articles of extreme value on a subject on which altogether too little attention is given.

The Operation of Foreign Exchange Control in Canada.

The Canadian Chartered Accountant.

An article of extreme value to all accountants under present conditions.

What Is Unemployment Insurance?

Business Management. March.

In view of the statements recently made that the Canadian Government intends to offer a system of Unemployment Insurance at the next session of Parliament, this article is very timely.

COST AND MANAGEMENT

SITUATIONS WANTED

Young man, single, with many years' experience in Banking and Accounting. Graduate in Cost Accounting, and with experience as Office Manager, seeks change in position. Fully capable of taking charge, and remuneration asked only moderate for good start. Well recommended and is earnestly seeking a real opportunity to display knowledge and ability. Apply Box 45, "Cost and Management".

A thoroughly experienced Cost and Industrial Accountant desires position with sound company. Well versed in cost and production work and all phases of accounting. Experienced also in Office Management, Purchasing, etc. Particularly well versed in the Canning and Food Industry. Apply Box 48, "Cost and Management".

Cost Accountant, at present resident in Toronto, seeks position with progressive company. Particularly well versed in the Printing Industry, but has sound knowledge of Cost Accounting and is at liberty to go anywhere for good position. Apply Box 50, "Cost and Management".

Young man, at present engaged, seeks change to sound progressive company. Has had experience as Chief Accountant, Cost Accountant, Public Auditing, Payroll work, etc. Thoroughly practical and experienced. At present working in Ontario, but distance no object for good position. Box 51, "Cost and Management".

Young man, 10 years' bank experience, studying higher accounting and cost accounting, at present employed in Western Canada, desires position with industrial company with prospects of advancement to good man. Will go anywhere. Apply Box 52, "Cost and Management".

Young man, 25 years of age, with eight years' experience as Bookkeeper and Accountant, desires position with sound organization. La Salle graduate. Excellent references. Apply Box 55, "Cost and Management".

Young man, married, with many years' experience in Accounting, Cost Accounting and Purchasing, Office Management, etc., at present employed in Mining Office, seeks change. Would prefer position with sound company in Mining Industry or Industrial company. Distance no object if position is sound. Highest references. Ability unquestioned. What have you? Apply Box 56, "Cost and Management".

Young man, with some experience on Inventories and Stock Ledger work. Student of Accounting and Cost Accounting. Desires position in Toronto or vicinity. Apply Box 57, "Cost and Management".

Young man, with both complete Junior and Senior Matriculation, two years at University on Mathematics and Physics, and at present studying Accounting and Cost Accounting, is anxious to obtain position. One year experience in Accounting and four years' experience in Stores, Purchasing and Records. What have you? Apply Box 58, "Cost and Management".

Young man with five years' experience in Cost Accounting and a keen student of Accounting and Cost Accounting, is anxious to obtain position in Ontario. Apply Box 59, "Cost and Management".

EMPLOYERS

We have on our list several young men with experience and who are students of Accounting and Cost Accounting, who are anxious to obtain positions. Why not communicate with us when filling vacancies?

WORKS ORGANIZATION AND LAYOUT

So many requests have been received from student members for an article on Plant Organization and Layout that we publish it herewith.—Ed.

Works Organization and Layout

By

E. JAMES KINVIG, A.M.I.Mech.E.

A Paper given before the Students' Society of the Liverpool and District Branch of the Institute of Cost and Works Accountants, March 27th, 1939.

Published by kind permission of The Cost Accountant.

It is impossible to give details of Works Organization and Layout in this article, as such details are many and often singular to the trade or manufacture to which they apply. Further, it is not the writer's intention to cover the whole of the fundamentals and principles of good organizing and layout, as these, too, as so numerous as to have been allotted complete books.

Organization.

Organization is the development of a system. It is not dependent upon the presence of Executives. An Organization in which work is held up due to the absence of an Executive, has never achieved the essence of a good Organization. It has often been said, "To organize is to deputize". Each man should know his exact responsibility, and duty should be so detailed that overlapping of duty is almost an impossibility. This, too, applies to the source of management, as no man can serve two masters. Organizing may be said to be the development of a system to eliminate waste both in material, time and labour, in which routine work can be handled automatically without waiting for higher authority. Organization consists of making rules and regulations by which the system is able to run smoothly and efficiently, together with reports and statistics which show at all times, the position of manufacturing and financial details. In other words, organization is a control of a system that demands results to be achieved by subordinates.

Military and Line Organization, which can almost be called a "One man business", is impossible with present day autocratic industrial government. It is dependent on one man, without whose presence the system cannot be fully operated.

Functional Organization makes separate identities of Planning, Performance and Manufacture. It allows for the distinction of processes, and in such organization, co-ordination is extremely important. It must be said, however, that Functional Organization does allow the training of employees to be carried out in greater detail.

Line and Staff Organization is an organization controlled by specialists, and although such organization is practicable and often very efficient in large undertakings, it falls down in smaller companies, due to its expensive nature.

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The general method used in Great Britain is that of a compromise between Functional and Line and Staff.

It has been said before that organization is a development of a system. Now a system requires careful consideration before putting into operation, and thought must be given to the cost of application and the danger of killing initiative and imagination of the employees. There is nothing more damning to any organization than for the employees to find themselves merely cogs in a machine. (The writer apologizes for using the last phrase, but it is thought to be probably the most descriptive and to the point). The planning of a system should be the co-ordination of effort. Planning can be carried too far, and may have a dehumanizing effect on the employees, and in such cases may kill a perfectly good system in the same way as being over-systemized.

Management.

Management is human development with the view to better and more efficient production. A good manager will study psychologically all his work people, and will from this aspect develop his Management Organization.

F. W. Taylor (1880-90) endeavoured to lay down the principles of good management. Unfortunately, he did not consider the human element, and this proved to be one of the reasons for his system of management not being used to-day.

Time Study.

Time Study can briefly be described as the study of waste. The importance of such a study cannot be over-emphasized, but the application of the study is very important, as the psychological effect again may cause poor results to be achieved. F. W. Taylor included Time Study in his principles of Management. He was followed by Gilbreth who developed units of manual labour in logical sequence. These units were called Therbligs and were as follows: search, find, select, grasp, position, examine, use, take apart, inspect, transport, unavoidable wait, avoidable wait, rest and plan. These form a complete cycle of manual motion.

Costing.

The element of costing consists of Prime cost—Works overhead—Office overhead. These may be formulated thus:

Prime Cost plus Works Overhead = Works Costs.

Works Cost plus Office Overhead = Gross Cost.

Gross Cost plus Profit = Selling Price.

The budgeting of costs is vitally important. Such costs should include future repairs and overhauling in with the general overheads, remembering the principle of a "stitch in time".

The allocation of overheads in costing is equally important and can be done in several ways as follows:

(1) A flat rate % annually of overheads to be incorporated in Works Costs.

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- (2) % on direct labour.
- (3) % cost (in sterling) on materials.
- (4) The man hour method which consists of overheads being split up into units of man hours.
- (5) Machine hour method.

The detailing of overheads to various shops should be carefully considered, and factory expense such as cleaning, etc., should not be charged when costing jobs.

Depreciation.

Depreciation must always be allowed for and four of the principal methods are stated below:

- (1) A straight line method which deducts annually a similar sum for depreciation.
- (2) A reducing instalment system which reduces year by year, starting with a comparatively high figure; it should be noted in this case that the maximum depreciation falls when the plant is new and reduces as the plant approaches scrap period.
- (3) The annuity method which reduces the value of the plant to scrap at the end of the estimated life of the plant.
- (4) The development of a large sinking fund.

Charting.

Charting can be one of the greatest aids to management, if it is systematically carried out.

Bar Charts are used for showing annual sums and figures, and are usually only used for comparing annual totals.

Trend Curves or Historical Charts. The value in £s of production is plotted against the date.

Z Charts show a weekly production figure and accumulative figure and a moving annual total, these all being plotted against the date, and at the end of the year form a chart similar to a letter Z.

Frequency Charts are used for budgeting production of standard articles, and size or type are plotted against the date.

Gantt Charts are either used for machine production or for a schedule of production.

Standardization.

Standardization of labour, materials, tools, equipment, process and performance can be carried out in mass production shops with beneficial results from the production cost point of view. Jobbing work does not allow for a similar amount of standardization, but materials can be standardized in this class with a view to standardization of costing. The British Engineering Standards Association formed in 1901 and incorporated in 1918 gives many standard limits and specifications which are known by "British Standard Specification No. . . ."

Inspection.

The importance of regular inspection in mass production shops cannot be too well emphasized, as it is important not only from an assembly point of view, but also from the machine, tool and jig aspect, too.

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Incentive Wage Systems.

One of the main elements of organization consists of the payment of wages, which must always be such as to obtain the confidence of the workers in industry. There are many incentive wage systems that have been tried in the past, some of which are still in practice to-day. However, as an organization must be adapted to the class and type of work it controls, wages, too, are often applicable to their own type of industry.

The Halsey System guarantees a day rate, and the time saved on the job is shared between the employer and workman. The Roman System also has the guaranteed day rate and the bonus is calculated on the time saved divided by the standard time. The Taylor Differential Rates are not used by many manufacturers owing to the fact that these definitely, as in the case of Taylor's Management Systems, do not consider the human aspect. They have a high rate of pay for the workman who completes the job on time, and an alternative low rate for those who fall below the standard time. The Task and Bonus System developed by Gantt, who was also an associate of Taylor, guaranteed a day rate to eliminate the difference of extreme in Taylor's system, and gave a bonus of 20% if the job was completed on time plus a percentage of time saved if the job was completed before the standard time. The Emmerson Plan guarantees a day rate, and a bonus is paid from about 70% efficiency of the task rate plus an additional percentage of the time saved.

The Profit Sharing Plan of wage payment which was first started by Maizon Leclair in 1840 can be very incentive to the workers, but unfortunately bad management can completely use up any available profit that might have been due to the workers' initiative. Co-partnership is usually of the benevolent type in this country, shares being issued to employees for good service or shares issued at favourable price for the benefit of employers only.

Unfortunately, profit sharing and co-partnerships systems reduce the mobility of labour.

Plant.

It is worth while mentioning here the value of keeping up to date with plant. New plant increases overheads, but decreases production costs. An annual or periodical overhaul of all existing plant should always be made a feature in any good organization.

Stores.

The position of Store Keeper is important, as this man will make all the difference between success or otherwise of a vital department in any works.

Systems of Store Keeping are numerous, but Bin Cards, Codes, etc., should always be considered as a help to stocktaking. Purchasing for a budgeted market requires a great deal of experience, which can only be acquired by careful study of home and foreign markets. The policy of standardizing by buying from one firm only should never be adhered to.

In conclusion, an efficient organization should encourage suggestions from the staff and these should, providing they are feasible, be developed

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to a degree at which they can be judged as being practical or not. Visits to Works should be encouraged, because these visits often give the employee enthusiasm in his own industry, with a view to bettering the products which he is engaged in producing.

WORKS LAYOUT

Position of Site.

The location of a new site is the most important factor of any industry, and should be considered from the following aspects:

- (1) Concentration of labour;
- (2) Concentration of industries;
- (3) Facilities of staff travel;
- (4) Source of power;
- (5) Local taxation;
- (6) Market concentration;
- (7) Future development and growth of the site.

Capacity.

The capacity of the factory or works is entirely dependent on the industry concerned. The amount of space required for each workman can easily be obtained from Factory regulations, etc.

Buildings.

Whilst the cost per square foot on two or more storey buildings decreases with the height, the advantages of a single storey building should not be overlooked. A single storey building can save considerable amount of lighting costs with Northern Lights, and spans up to 60 ft. are easily obtainable. However, the heating of such a building is far more expensive due to the vast expanse of glass in the roof. On the other hand, to endeavour to save light on two or more storey buildings, a greater amount of glass has to be used, and the total width of the building is limited if daylight is to be used to its full advantage. However, probably the deciding factor will be the price of the land per sq. yd. In building a factory, the Factory and Workshops Acts should be incorporated together with any local Building Laws when designing the shell of the building. The type of floors should be considered carefully, and the layout of service lines should always receive some thought at this period.

Lighting.

It is thought that the importance of correct artificial lighting should be mentioned here, and rough figures are given for intensity of light of various departments:

Offices 8/10 ft. candles.

Works 6/8 ft. candles.

Passage Ways 4/5 ft. candles.

Fine Work such as Drawing Office work requires up to 25 ft. candles.

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However, it must be remembered that glare should be reduced to a minimum and even intensity is the ideal feature of good lighting.

Ventilation.

Ventilation can only be considered with the industry itself, and the Factory Acts lay down specified regulations regarding the subject.

It is, however, interesting to note what has been said to be ideal conditions from a ventilation point of view—that is, the humidity should be 60%, the heat 60 degrees F.H. and the CO² contents should not exceed 7 parts per 10,000 by volume.

Layout.

The layout of a factory is always applicable to the job concerned. However, the main idea is a complete continuous route available in the factory. The position of Stores depends, too, on industry, and whether or not individual shop stores or centralized stores are going to be used is a matter of consideration with the type of production. Labour-saving devices should always be used wherever possible, such as conveyors, trucks, small hoists. Heavy and light machinery should never be placed in close proximity, owing to the fact that vibration of a heavy machine will upset the details of accuracy on the lighter machine. The position of the Drawing Office should be such that access to the works is easy. The lining of passage ways by painting white lines throughout the whole of the factory is a very good idea, and creates a definite feeling of tidiness and efficiency which has a psychological effect on the workers themselves.

Safety First precautions are vital, and every effort should be made to make the whole of the factory "Safety First conscious". Such items as a First Aid Room, Canteen, Cycle Sheds and Staff Rooms should not fall outside the details of investigation. The capacity of the source of power, whether it is made by the factory itself or brought from Local Authorities, should always show a good margin on the actual present needs as and when the factory is initially opened.

In conclusion, the writer would point out that although he has endeavoured to cover a fair amount of the ground in both Organization and Layout, he wishes to state that many points of interest must have been omitted, for which he tenders his apologies.

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